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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/680,273	10/08/2003	Taizo Morinaka	101136-00098	6338

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EXAMINER	
MCDONALD, RODNEY GLENN	
ART UNIT	**PAPER NUMBER**
1753	

DATE MAILED: 03/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/680,273	MORINAKA ET AL.	
	Examiner	**Art Unit**	
	Rodney G. McDonald	1753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 December 2005*.
2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.
3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2 and 11-18* is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5)☐ Claim(s) _____ is/are allowed.
6)☒ Claim(s) *1,2 and 11-18* is/are rejected.
7)☐ Claim(s) _____ is/are objected to.
8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.
10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a)☐ All b)☐ Some * c)☐ None of:
1.☐ Certified copies of the priority documents have been received.
2.☐ Certified copies of the priority documents have been received in Application No. _____.
3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 2, 12, 13 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Masahiro (Japan 2000-339784) in view of Sone (U.S. Pat. 6,200,431).

Regarding claim 1, Masahiro teach in Fig. 6 a thin film forming apparatus having a sputter film forming source having a cathode 4 and target T and a reactive gas supply source 11 in the same vacuum chamber 1. Both sources oppose a substrate S supported on a substrate holder 5. The sputter film forming source is provided with a sputter gas introduction port 3. The reactive gas supply source is provided with a reactive gas introduction port 9 and a reactive gas exhaust port 2. A manometer 8 measures the pressure in a vacuum chamber and sends measured values to a control section. A divider 10 (i.e. shield) divides the sputter section from the reactive gas section. (See Fig. 6; Machine translation paragraph 0019; Machine translation paragraph 0032) The sputter gas flow path is at a higher flow rate higher than the reactive gas in the vicinity of the sputter gas introduction port toward the main evacuation port. (See Fig. 6) Masahiro et al. teach that the gas can be controlled by a gas control section, which controls the reactant gas and the sputter gas such that sputter process and reactant process can be repeated. (See Machine translation Claim 5) Masahiro et al. teach that the gas can be controlled by a gas control section, which controls the reactant gas and the sputter gas such that sputter process and reactant process can be repeated. The processes are repeated alternately. (i.e sputtering and reactant process). (See Machine translation Claim 1 and Claim 5; See Abstract)

Regarding claim 12, the ionization generation of the gas section 11 which ionizes the nitrogen gas is considered to be an ion gun. (See Machine Translation paragraph 0021)

Regarding claim 13, Masahiro teach a thin film forming method using a thin film forming apparatus having a vacuum chamber 1, a substrate S disposed in the vacuum chamber, a sputter film forming source T provided with a gas introduction port 3, a reactive gas supply source with a reactive gas introduction port 9 and a reactive gas exhaust port 2 comprising forming a gas curtain by sputter gas flow shielding a sputter target from a reactive gas from gas introduction source 3, depositing a metallic species on the substrate by sputtering, irradiating active species originating from a reactive gas to the thin film of a metallic species deposited on the substrate to convert a thin film of a metallic species to a metallic compound thin film and alternately repeating several times. (See Abstract; Machine translation paragraph 0033, 0020, 0021)

Regarding claims 2 and 15, Masahiro teach repeating the sputter steps and reacting steps alternately. (See Abstract; See Machine translation 0012) This is interpreted to include the sputter process which requires the argon gas and the reaction process which requires the reactive gas. The reaction process not requiring the sputter gas since a reaction is taking place and thus suggesting cut off of the sputter gas.

The differences between Masahiro and the present claims is that the main evacuation port being closer to the reactive gas supply source is not discussed (Claim 1).

Regarding the main evacuation port being closer to the reactive gas supply source (Claim 1), Masahiro teach an evacuation port 2 located closer to the reactive gas supply source. (See Masahiro discussed above) Here the main evacuation port and reactive evacuation port are one in the same. Sone teaches in Fig. 6 providing a sputter gas inlet 3and a reactive gas inlet 4. The reactive gas inlet area is provided with an exhaust for exhausting a reactive gas and main exhaust 24 located closer to the reactive gas inlet than the sputter source. (See Fig. 6)

The motivation for utilizing a main evacuation port closer to the reactive gas supply is that it allows for exhausting the air from the vacuum chamber. (See Machine Translation 0019)

Masahiro et al. teach valves for controlling the gas feed and exhaust. (See Fig. 6) Sone teaches valves 27, 28 and 30 for controlling the exhausting. (See Sone Fig. 6)

The motivation for providing gas feed and exhaust valves is that it allows for adjusting the conductance. (See Sone Column 8 lines 65-68)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Masahiro by utilizing an evacuation port closer to the reactive gas supply and utilizing adjustable conductance valves as taught by Sone because it allows for exhausting air from the vacuum chamber and for adjusting conductance in the chamber.

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Masahiro in view of Sone as applied to claims 1, 2, 12, 13 and 15 above, and further in view of Scobey et al. (U.S. Pat. 4,851,095).

The difference not yet discussed is the in line deposition.

In Fig. 18 Scobey et al. teach forming the film by in-line deposition. (See Fig. 18)

The motivation for utilizing in-line deposition is that it allows for depositing on flat substrates. (Column 15 lines 15-18)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized in-line deposition as taught by Scobey et al. because it allows for depositing on flat substrates.

Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Masahiro in view of Sone as applied to claims 1, 2, 12, 13 and 15 above, and further in view of Kugler (U.S. Pat. 5,292,417).

The difference not yet discusses is the selection of the reactive gas flow rate corresponding to the sputter gas flow rate.

Kugler teach a feedback control loop where the gases are controlled to operate the sputter deposition device in a transition mode based upon gathered data. (See Abstract; Column 12 lines 25-58; Fig. 1)

The motivation for providing control means to control operation of the apparatus at certain modes is that it allows for achieving a stoichiometric coating. (Column 3 lines 56-57)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have utilized a control means to control the mode of operation of a deposition device as taught by Kugler because it allows for achieving a stoichiometric coating.

Claims 16 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Masahiro in view of Sone as applied to claims 1, 2, 12, 13 and 15 above, and further in view of Hartsough (U.S. Pat. 4,420,385).

The difference not yet discussed is the thickness of the depositing layers (Claim 16).

Regarding the thickness of the layers (Claim 16), Hartsough teach depositing 11 Angstroms during the process. (Column 6 lines 29-30)

The motivation for depositing a thickness is that it allows for depositing dielectrics. (Column 2 lines 50-51)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have deposed a thickness of film as taught by Hartsough because it allows for depositing dielectrics.

Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Masahiro in view of Sone and further in view of Kugler as applied to claims 1, 2, 12, 13, 14 and 15 above, and further in view of Hartsough (U.S. Pat. 4,420,385).

The difference not yet discussed is the thickness of the depositing layers (Claim 16).

Regarding the thickness of the layers (Claim 17), Hartsough teach depositing 11 Angstroms during the process. (Column 6 lines 29-30)

The motivation for depositing a thickness is that it allows for depositing dielectrics. (Column 2 lines 50-51)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have deposed a thickness of film as taught by Hartsough because it allows for depositing dielectrics.

Response to Arguments

Applicant's arguments filed 12-19-05 have been fully considered but they are not persuasive.

In response to the argument that the prior art does not teach a shield means for preventing the reactive gas from remaining in the vicinity of a sputter target, it is argued that Masahiro et al. teach a shield means 10 for preventing the reactive gas from remaining in the vicinity of the sputter target. Furthermore, Sone et al. teach a shield 6 for preventing the reactive gas from remaining in the vicinity of the sputter target. (See Masahiro et al. and Sone et al. discussed above)

In response to the argument that the prior art does not teach forming a gas curtain by the sputter gas flow shielding a sputter target from a reactive gas after evacuation of the chamber, it is argued that in Masahiro et al. teach providing a sputter means 3 for providing a sputter gas in the area of the target T. The sputter gas acts as a gas shield. (See Masahiro et al. discussed above)

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rodney G. McDonald whose telephone number is 571-272-1340. The examiner can normally be reached on M- Th with Every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X. Nguyen can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Rodney G. McDonald

Rodney G. McDonald
Primary Examiner
Art Unit 1753

RM
March 1, 2006